

Adult Transplant Outcomes, Single vs. Pooled Cord Blood Transplants

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Adequate cell dose can be a limiting factor in using umbilical cord blood (UCB) for adult transplantation, therefore clinical protocols to combine two UCB products have been developed. Adult data using UCB products from the SLCBB was evaluated to determine if augmentation of cell dose increases the safety of adult transplant.

We evaluated 106 cord blood unit transplants performed at 27 transplant centers for adult patients (>18 years of age) in which minimum 0-3 months outcomes and post thaw total nucleated cell count (TNC) were reported, for pooled UCB transplants where both units infused were from the SLCBB. Population characteristics include an even distribution in gender, primarily treated for malignant diseases (95.1%), median age of 43.8 (range 18.6-64.8), median weight of 72.0 kilograms (kg) (range 41.0-120.4).

For single cord blood transplants, units providing a median post processing dose 2.6×10^7 cells/kg (range 1.1-8.5) were selected, but post thaw data indicates that only a median cell dose of 2.0×10^7 cells/kg (range 0.62-6.9) were infused. In the dual cord protocol, two units chosen to supply a median post processing dose of 4.7×10^7 cells/kg (range 2.8-6.7) yielded a median infused dose of 3.6×10^7 cells/kg (range 2.3-5.7) once thawed. TNC recoveries after cryopreservation average 80%, but the impact is more profound in the single transplant setting where cell dose is diminished to $< 2.0 \times 10^7$ cells/kg in 51.8% of all cases, a dose proven to be associated with less successful outcomes. When combining 2 units, a cell dose of $> 2.0 \times 10^7$ cells/kg was maintained in all cases. This finding led the bank to evaluate potential differences in overall survival and neutrophil engraftment between the 2 transplant populations. Probabilities were estimated by the Kaplan-Meier method. Median time to ANC $> 500/\text{mm}^3$ was similar in both groups (pooled 18 days, n=21; single 21 days, n=73; p=0.3027) but the difference in overall survival between the two groups approached significance (p=0.0555). Overall patient survival in the pooled setting (n=23) was 13.26 months and in the single cord setting (n=83) was 3.32 months.

Since TNC recovery is unaffected by product size, selection of a single UCB unit for transplant in adults based on the post processing cell dose may result in a less than adequate dose. Preliminary data indicates that pooling 2 units uniformly allows the maintenance of a cell dose of $> 2 \times 10^7$ cells/kg, resulting in improved patient outcome.